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ABSTRACT

In the 1920s and 1930s, interpretations of reading readiness held that learning to read occurred at a specific point in cognitive development. Postponement of reading instruction until a child reached this stage of maturity was widely accepted at that time, and throughout the 1940s and 1950s. The 1960s marked a transition period in terms of approaches to reading readiness instruction and although several studies contributed to the "teach more/teach sooner" climate, the maturation concept of reading readiness continued into the 1970s. Visual and auditory processes play a primary role in the acquisition of reading skills. One observable characteristic of the maturation of a child's visual perception processes is letter recognition, but letter name training by itself is not likely to affect reading skills. Research has shown that a child's ability to segment words by phonemes in kindergarten correlates with reading success, and that integration of auditory and visual processes promotes reading development. Piaget's cognitive stage theories have been studied in conjunction with reading readiness and, though current research has failed to show a direct connection between Piagetian theory and reading acquisition, the groundwork for further study has been laid. Psycholinguistic theory provides a global or "whole child" model of language development in both its oral and its written modes. A maturation of the readiness concept can be seen through the increased scope and diversity of approaches to its study. (SRT)

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Essential Prerequisites for Beginning Reading Instruction: An Historical Review

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Abstract

This research paper investigates major developmental and cognitive prerequisites necessary for a child's success in beginning reading instruction. In order to provide the perspective needed for the understanding of current reading readiness concepts, a review of key reading readiness studies from the earlier half of this century will be presented. The historical review will be followed by an examination of recent research which relates perceptual, cognitive, and language processes to the acquisition of reading skills. In conclusion, an interpretation of reading readiness which integrates these three processes will be proposed.

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Introduction

It is late September. They are ready. They haven't dozed off at snacktime for days now. They can find the office. They can carry a cafeteria tray. They maneuver their way to the Pumpkin bus with aplomb. Most of them can find "the basement". They are ready. It is time to pass out the preprimers. Are they ready?

In A Dictionary of Reading and Related Terms, reading readiness is defined as "the readiness to profit from beginning reading instruction: the teachable moment for reading". The definition is elaborated upon with the following note. "The concept itself has grown in depth and complexity, though not necessarily in clarity."

The opening paragraphs of this paper highlight both the oversimplifications as well as the complexities frequently associated with the concept of reading readiness. The intent of this research paper is to investigate the major developmental and cognitive prerequisites necessary for a child's success in beginning reading instruction.

The term reading readiness became prevalent during the mid twenties and early thirties. Therefore, an historical overview of the concept will provide the perspective necessary for the understanding of current interpretations of reading readiness. In reviewing state of the art literature on this topic, many facets of development must be considered. Major areas include perceptual development, cognitive development, and language acquisition. I have concluded that attempts to eliminate any one of these elements would lead to at best, only a partial interpretation, or worse, an inadequate representation of essential reading readiness factors. The body of this paper focuses upon current theory and research on perception, language and cognition. This will be followed by an interpretation of reading readiness which integrates these three processes in an interactive model.

Historical Overview

In order to more clearly understand current theory on the concept of reading readiness, it will be important to gain an historical perspective of reading readiness as it was viewed in the early half of this century. This section will review key studies of the 1920's and 1930's and their subsequent impact on reading readiness instruction in the 1950's and 60's.

During the twenties and thirties the concept of maturation or "neurological ripening" had a major influence upon reading research conducted at that time. Early interpretations of readiness for reading instruction held that learning to read occured at a specific point in cognitive development. Postponement of reading instruction until a child reached this stage of maturity was widely accepted at that time.

Gray (1941) cited the Report of the National Committee on Reading from 1925 which indicated that not all students entering grade one were equally prepared for reading instruction. The report also emphasized the importance of training and experience in preparation for reading instruction. The 1925 publication prompted further research into the area of mental maturity and reading readiness. In 1929, Raybold observed that "pupils with a mental age of 76 months made more rapid progress than did those who were less mature" (cited in Gray, 1941 p.48).

The most notable reading readiness study of the time was conducted by Morphette and Washburne (1931). These researchers attempted to discover the optimal time in the mental development of children when, in general, reading skills could be readily acquired. In this study, results of the Detroit First Grade Intelligence Test and the Stanford Revision of the Binet-Simon Scale were used to determine the mental age of children entering grade one in September, 1928. Reading progress was subsequently charted by the number of instructional steps successfully completed in the grade one reading program by February of the school year. Each child was also assessed on the number of sight words he or she had acquired by the month of February. A similar study was conducted during the 1929-1930 school year. In this study however, the Pintner-Cunninham Primary Mental Test was used in place of the Binet-Simon Scale.

Results of the Morphette and Washburne study indicated that the correlation between mental age and learning to read ranged from .50-.65. This led Morphette & Washburne to conclude that "When mental age was determined by the Detroit test, children with mental ages of six years six months made far better progress than did the less mature children and practically as satisfactory progress as did children of a higher mental age" (Morphette & Washburne, 1931 p. 97). Morphette & Washburne urged teachers to delay the teaching of reading until the child reached the six and a half year mental level in order to decrease the chance of failure and its accompanying discouragement.

Gates (1937) questioned the validity of Morphette and Washburne's conclusions and conducted his own study of the correlation between mental age and reading readiness. Four groups of grade one students were tested to determine their mental age at the beginning of grade one. Reading achievement tests were administered at the conclusion of the year. In addition to testing, Gates varied the instructional methods and materials utilized among the four groups of students. The instructional variations ranged from considerable amounts of supplementary materials and close supervision of teaching methodology, to what was considered to be inferior teaching materials and instruction.

Results from Gates's study varied significantly from those obtained by Morphette and Washburne. Although correlations between mental age and reading achievement ranged from .55 to .62 in classes where the best instruction was conducted, Gates' findings indicated that a lower correlation (.34-.44) existed between mental age and achievement in rooms where the poorest instruction was provided. Gates concluded that "Reading is begun by very different materials, methods, and general procedures, some of which a pupil can master at the age of five with reasonable ease, others of which would give him difficulty at the age of seven" (p. 62). Gates advocated teacher determination of readiness for reading instruction based upon the type of reading program used and the demands it places upon a child.

Upon comparison of the two studies, differences will be noted in terms of design. Gates appears to have investigated the problem more thoroughly, in that variation of instructional methods and materials were included in his study. Furthermore, Gates' study was conducted upon a larger population (N=246) when compared to Morphette and Washburne's (N=141). The validity of the Morphette and Washburne study may also be questioned due to the change in testing instruments used in the second year of the study. The researchers offered no clear reason for the change in tests. Moreover, it is important to highlight the different methods of assessing reading achievement employed in the two studies. In their method of assessing reading progress, Morphette and

Washburne relied upon teacher concensus based on the skills children who seemed ready for reading at the beginning of the school year had usually acquired by February. In contrast, Gates measured reading achievement by an average of three Gates Primary Silent Reading Tests, which would appear to be a more objective method of assessment.

Despite the weaknesses in the design of the Morphette and Washburne study, it had a major impact upon reading readiness instruction at the time. Durkin (1980) observes the following:

> [The study] gave support to the 'doctrine of postponement, because most children entering first grade do not have a mental age of 6.5 years. It also supported the notion that development proceeds in stages, and it honored the measurement and testing movement by being precise and 'objective' (p. 53).

Throughout the forties and fifties, formal reading instruction was delayed in grade one by having all children participate in readiness programs, whether it was warranted or not. In 1960, The Educational Policies Commission of the National Education Association argued for reading readiness instruction. "Research shows that some children gain from an early start, others do not or are not ready to learn, even in grade one" (as cited in Mason, 1984 p.508).

The 1960's marked what appears to be a transition period in terms of the philosophy and approaches to reading readiness instruction. While the maturational concept of reading readiness appears to have had a continued influence upon many beginning reading programs, pressure for change began to emerge from many sources. Ollila, in his review of reading readiness in the sixties, addresses three major factors which he believes precipitated a change in the teaching of readiness and reading skills. "The jolt to the educational system began when Russia launched Sputnik and continued with the writing of Bruner and Hunt " (Ollila, 1980 p.3). The Sputnik launch, Ollila observes, triggered a nationwide mentality characterized by the demands, "Let's teach more in our schools, and let's teach it earlier!" (p.3). A similar attitude prevailed in the works of both Bruner and Hunt. Durkin (1977) quotes psychologist Bruner's proposal that "We begin with the hypothesis that any subject can be taught effectively in some intellectually honest form to any child at any stage of development"(p.4). Hunt's publication, Durkin indicates, "proposed certain hypotheses about young children, all of which assigned special importance for intellectual development to the early years" (p.4).

Durkin's 1966 study of early readers also contributed to the "teach more/teach sooner" climate of the sixties. Durkin found 49 children out of 5103 in Oakland, California (1958) and 180 children out of 4465 in New York (1961) who, at the beginning of first grade, could read a list of primary-level words (as cited by Mason, 1984 p. 512). Durkin concluded that readiness is teachable, basing her definition of readiness on the work of Ausubel (1959). "Each child's capacity at any given time is the product of an interplay among genetic endowment, maturation, experiences, and learnings. What learning to read demands of children is dependent upon both the kind and the quality of instruction" (Durkin, 1980 p. 63).

As late as the 1970's, a maturational concept of reading readiness continued to exist. Mason (1984) cites two studies influenced by this concept:

> K. Read (1971), a long standing authority on preschool education, mentioned reading only in the context of providing and arranging books and reading to children. She espoused instruction through games that encourage use of senses, imagination, and problem solving and through conversations with children . . . Leeper, Dale and Witherspoon (1974) took a position against formal teaching of reading,

arguing that research indicates a lack of permanence of reading skills taught in kindergarten and that gains are dependent upon subsequent reading instruction. They concluded that instruction for all five-year-olds is questionable and may be harmful for some (pp. 508-509).

This summary of reading readiness from the 1920's through the early 1970's shows that the concept of maturation predominated both research and instructional practice. In A Dictionary of Reading and Related Terms, maturation is defined as follows:

> maturation-1. n. the total process of growing and developing from immaturity to adulthood or maturity. Note: Learning is influenced by and also influences maturation.

The remainder of this paper will attempt to explore recent research in the area of reading readiness. It will be observed that the maturation issue is multi-faceted, involving the development and interaction of perceptual, conitive, and language processes. It may be observed that the research itself in these areas has, or is, in a sense, undergoing a process of maturation.

Perception and Readiness

It is clear that visual and auditory processes play a primary role in the acquisition of reading skills. The intent of this section is to provide an overview of current research in the area of perception. Visual perception and its relationship to a child's ability to differentiate the printed forms of letters will first be considered. This will be followed by a review of research in the area of auditory perception or, more specifically, the ability of a child to analyze speech into units of sound. The integration of auditory and perceptual skills will also be considered through the review of an analysis of research conducted in this area.

Visual Perception

Of visual perceptual processes, Frith (1980) states: "It cannot be denied that one basic aspect of reading, whether on the skilled or unskilled level, is and remains a visuo-spatial task" (p.1). Frith summarizes the experimental analysis of work conducted by Braine from 1960-1973. From her studies of Braine's work, Frith suggests that a developmental hierarchy of orientation perception is evident. The key features of this hierarchy are as follows:

> The earliest distinction the child makes is between upright and non-upright. The category non-upright includes shapes that are upside down and sideways. These latter two categories become differientiated at the next stage, and at a further stage the sideways category is differentiated into left and right. This model implies that we can't expect a child to make correct left/right distinctions unless he has learned to make the other distinctions first. (pp. 4-5)

Both Frith and Downing & Lundsteen (1980) observe that the developmental progress of perceptual abilities may be linked to Piaget's theory of cognitive development. "As Piaget has shown, children learn names for things after they have learned to discriminate them" (Downing & Lundsteen, 1980 p.20).

Gibson (1985) has studied the principles of perceptual learning and development since 1960. She has noted three trends in perceptual development based upon the studies she has participated in (Gibson & Gibson, 1955; Gibson, Gibson, Pick,& Osser, 1962; Gibson, Osser, Schiff,& Smith, 1963; Gibson, Schapiro,& Yonas, 1968). "The trends were identified as: 1.) increasing

specificity of correspondence between information in stimulation and the differentiation of perception; 2) increasing optimization of attention; 3) increasing economy in the perceptual process of information pickup" (p. 145). Gibson has also observed that there appears to be a kind of "conciousness raising", or increased awareness of cognitive processing which parallels growth in perceptual development.

In essence, letter recognition may be viewed as one observable characteristic of the maturation of a child's visual perception processes. Many researchers have considered letter recognition tasks a more reliable correlate of reading achievement when compared to gross discrimination tasks. Downing & Lundsteen (1980) observe that most studies have found low correlations between reading success and visual perception tasks if the tasks did not consist of printed letters or words. Further substantiation is provided by Barrett (1965), who reviewed over 30 years of research in the area of letter recognition and its influence upon reading readiness. "Barrett showed that knowledge of letter names had a higher predictive value (.55 -.65) than an ability to match letters directly or from memory (.25)" (cited in Mason, 1984). Mason also cites studies conducted by Olson (1958) and de Hirsch, Jansky, & Langford (1966) on letter naming in kindergarten and its correlation with second grade reading achievement. Moderate correlations (.55) were observed in both studies.

In summarizing the research on visual perception and reading readiness, Mason (1984) provides a cogent perspective. "Letter naming, then, ought to be considered as a mask for more enveloping concepts about print. If so, cursory letter-name training is not likely by itself to make a difference in reading" (p.525). The evidence provided by Frith, Gibson and others support this conclusion.

Auditory Perception

Reading is frequently referred to as speech written down. Downing and Lundsteen (1980) define auditory perception as being concerned with "the intelligent interpretation of the sound waves picked up by the ears" (p.21). Mason (1984) writes that, "In some way unknown to us as yet, the child must work analytically to distinguish sounds in words and relate those to letters" (p.526). The term phonemic analysis in this section will refer to the ability of a child to associate the relationship between a phoneme, or sound unit with graphemes, or letters.

Many research studies have shown that a child's ability to segment words by phonemes in kindergarten has been correlated with reading success. Mason (1984) cites the studies conducted by Liberman, Shankweiler, Fischer, & Carter, (1974); Shankweiler & Liberman,(1976); Calfee,(1977); as well as others. In the segmentation study conducted by Liberman, Shankweiler, Fischer and Carter (1974), preschool children were asked to tap on a table the number of segments heard in a word.

> The results showed that syllable segmentation was easier than phonetic segmentation . . . . Only 17% of the kindergarten children but 70% of the first graders succeeded in phoneme segmentation, while in syllable segmentation, the percentages were 48% and 90% respectively (as cited in Mason, 1984 p. 527).

Yopp and Singer (1985) cite the importance of tne ability to reflect on and talk about language in the acquisition of beginning reading skills. This ability to direct, regulate, monitor and evaluate one's own language is known as metalinguistic awareness. The purpose of their study was to determine if

children of varying levels of phonemic segmentation abilities would perform significantly better on sounding and blending tasks when they were given some metalinguistic and linguistic awareness assistance than when they were not given assistance.

Thirty-five kindergarten children of varying ethnic and socioeconomic groups participated in the study. As a prerequisite, knowlege of sound symbol correspondences in isolation was necessary. The subjects were also tested to assure that they were unable to perform the phonetic segmentation task prior to the experiment. The procedure consisted of instructing children on sounding and blending three letter CVC words. Children were told that the reason for being taught this skill was so that it could be applied to unknown words when reading.

Results of this study indicated that a main effect for phoneme segementation ability ($p < .0001$) was found. Hence, they observe that "Children strong in phoneme segmentation ability were the most successful at the sounding and blending reading tasks, followed by children with emerging phoneme segmentation ability. Children with only chance level phoneme segmentation ability were the least successful at the tasks" (p.140). The finding that Yopp & Singer consider more relevant is that beginning readers can perform significantly better when they are given metalinguistic and linguistic awareness assistance in the reading task ($p<.0001$). "The teacher can exert control over the success or failure of beginning readers by varying the demands of the stimulus task, the resources that must be activated by the reader, and the level of learning and criterion required for successful progress in learning to read" (p. 142).

Yopp & Singer conclude their study by making some connections to studies previously presented in this paper. They have observed, as did Gibson, that awareness of one's cognitive processes is associated with reading development. They have also concluded from their study that an adaptation of Bruner's dictum is applicable in reading readiness instruction. "We can successfully teach a child at any age the initial steps of reading acquisition provided our instructional conditions and demands upon the learner do not exceed the learner's level of cognitive and linguistic development" (p. 142). Yopp & Singer's findings also indirectly challenge Morphett & Washburne's observations by emphasizing the importance of instructional methodology versus age related prerequisites in learning to read.

Auditory/Visual Integration

Birch & Belmont (1965) as well as Chall (1967) found that early reading is associated with auditory and visual integration skills (as cited in Chall,1983). From studies of auditory-visual integration among normal and delayed readers ages 5-11, Birch & Belmont concluded that "'perceptual'factors were most important for initial acquisition of reading skills but that factors more closely associated with IQ were more important in its elaboration" (Chall, 1983 p.205). Birch & Belmont based this conclusion on an assessment procedure which involved matching a visual-spatial pattern to an auditory temporal pattern.

Kavale (1980) noted that objections to Birch & Belmont's conclusion were raised due to flaws in their assessment procedure. Kavale concluded that despite further refinements of Birch & Belmont's design, as well as further studies by other researchers, few definitive statements concerning the nature of the relationship between auditory and visual integration could be made. This problem prompted Kavale to conduct a study which provided a means of

compiling results from the numerous studies regarding the nature and relationship of auditory-visual integration and reading achievement. This procedure is known as a meta-analysis.

Through standard literature search procedures, thirty one studies related to auditory-visual integration were located and deemed appropriate for meta-analysis. Kavale's statistics represented responses from approximately 4400 subjects with an average age of 7.94 years and an average IQ of 103.67. Kavale found that refinements of the Birch & Belmont procedure in subsequent studies included longer versions of the task, increased test ceiling and more precision in presenting the auditory stimulii.

Significant correlations ($p < .10$) were found between auditory-visual integration and general reading ability as well as word recognition. These findings suggest to Kavale that auditory-visual integration is an important factor throughout the elementary grades. Tests of significance in this area showed at the preschool level ($p < .10$); at the primary level ($p < .05$); and a comparable association at the intermediate level. When intelligence was partialled out, Kavale concluded that "Auditory-visual integration appears dependent on intelligence for the more cognitive aspects of reading ability but independent for the more automatic aspects of reading ability" (p.952).

Kavale's research demonstrates that auditory-visual integration is a significant correlate of reading ability. Although the degree of correlation varies with the type of task involved, this finding is important when considering attributes of readiness for beginning reading.

Cognitive Development

The cognitive stage theories presented in this section are based upon the work of Jean Piaget. Representative studies relating this paradigm to reading readiness will be presented and discussed. It is assumed that most educators are familiar with the general outline of Piaget's cognitive stages. For the sake of brevity, definitions will be limited to the key subskills of the preoperational and concrete operational stages. These definitions will be provided in conjunction with the studies reviewed.

Piaget did not apply his theory of cognitive development to reading, however, Chall (1983) has based her stages of reading development upon Piaget's construct. Additionally, Waller (1977) has explored the research conducted in determining whether acquisition of Piagetian tasks can be utilized to ascertain readiness for reading instruction.

Of her scheme for cognitive stages of reading development, Chall states that "My objective has not been to prove or disprove the applicability of Piaget's general cognitive theories to reading. Instead, I have sought in his work and in the work of other developmentalists ideas and methods for developing a scheme that is of value for understanding reading" (p. 11). Chall's premise is that stages of reading development resemble stages of cognitve and language development. Each stage has a definite structure and differs both quantitatively and qualitatively from other stages. An analysis of Chall's reading stages is beyond the scope of this paper. However, a brief outline of her initial stages of reading development will most appropriately address the theme of this paper.

Chall characterizes the prereading stage (ages birth to six) as one in which the greatest series of changes occur. The child at this stage develops perceptual skills as well as control over language. She cites the work of Bissex, 1980; Chomsky, 1979; Clay, 1966, 1975; Downing & Thackeray, 1975 and others pertaining to the child's emerging awareness of the literate culture in

his environment. Chall quotes Feldman's (1976) observation on reading readiness. "Although there is some disagreement as to whether individual characteristics or environment and experience is the more powerful in developing prereading skills and abilities, most agree that both are involved and that an interactional model will prove to be the most fruitful for understanding and effecting improvement" (p. 14).

Stage one reading development (ages 6-7) is characterized by accomplishing the task of learning the arbitrary set of letters and associating them with corresponding parts of spoken words. In reference to phonemic awareness, Chall states, "Because it is difficult to hear the same sounds when they are in different positions in a word or in different contexts . . . a capacity for abstraction seems to be important, even for Stage 1" (p.16). The qualitative change which occurs at the end of stage one is that there is a consolidation and application of those reading skills acquired. The newly acquired skills may subsequently be utilized within a known context (eg. the basal reader).

Other researchers have attempted to link Piaget's model of cognitive development with reading acquisition. Waller (1977) provides an overview of investigations relevant to the role of preoperational and concrete operational thought in reading.

He reports ten correlational investigations of the relationship between performance of various cognitive tasks and some measure of reading or reading readiness skills. The majority of these studies have explored the link between conservation of number and subsequent reading achievement. Conservation refers to the ability to keep an unchanging property of something in mind (ie. quantity of liquid, number) under changing perceptual conditions. Correlations between conservation of number tasks and reading achievement have, according to Waller, been as high as .44 in various studies. Based upon these statistics, Waller concludes that, on average, conservers are better readers than non-conservers.

Seriation tasks involve the ability to logically order a set of objects. Waller reports the findings of a study by Scott (1969). This study is noteworthy because of the high correlations reported. The Metropolitan Readiness Test and a seriation test was administered to 356 kindergarteners of varied SES. Waller remarked that Scott gave little detail describing the specifics of the seriation procedure. More importantly, Waller indicates that the task appeared to be at least slightly different from what is typically done in seriation activities. Waller's observations regarding the design of the study are worth noting when considering the results of the study.

> Correlations between readiness (total reading score) and seriation were strikingly high--.71 for the trial and error condition, .72 for the operational condition, and .77 for the total seriation score. Correlations with reading subtests were all positive and ranged from .45 to .66. The correlation between total seriation score and total readiness score (including reading and number) was an astounding .82 (p. 14).

Kaufman & Kaufman (1972) also investigated seriation and its correlation to reading achievement. Findings from this study were less dramatic, showing a correlation of .55 (as cited by Waller, 1977 p.14).

Elkind, Waller reports, has conducted the only systematic investigation of the relationship between perceptual development and reading. The focus of Elkind's studies have been upon a decentration factor in reading. Decentration refers to the ability to take account of several aspects of an object or event at the same time. Waller provides only brief reference to

three studies conducted by Elkind and concludes that the results provide "moderate support for the role of perceptual regulations and reading . . .[the studies] should be carefully regulated and extended" (p.22).

In analyzing Waller's monograph on Piagetian prerequisies for reading, it is evident that further research is needed in this area. Although Waller feels that enough results have been reported to evidence a positive interrelationship between reading and concrete operational thought, a great deal of further study is warranted. "Considering the vast scope of Piagetian theory. . . and the complexity and importance of reading, the empirical and theoretical surface has barely been scratched" (p.24)

Three further studies relating concrete operational thought and reading achievement will now be considered. It should be noted that these studies are representative of the areas reviewed by Waller, but were conducted after the publication of Waller's 1977 monograph. The research topics include a study of operational thought and reading achievement (Robeck, 1981); Piagetian tasks as predictors of reading and math readiness in grades K-1 (Arlin, 1981); and the relationship between readiness for reading with perception and visual seriation skills (Reiff, Cannella & Perry, 1979).

Robeck explored the relationship between three measures of reading achievement and performance of five Piagetian tasks on 101 randomly selected first, second and third grade students. The Piagetian tasks consisted of conservation of liquid, conservation of weight, classification including class inclusion, multiple classification, and seriation. The Pupil Placement Test's Informal Reading Inventory (Hollander & Reisman, 1970) was utilized to measure reading achievement. This inventory provided graded oral and silent reading passages from the preprimer level through the ninth grade level.

Statistically significant correlations were reported in some of the Piagetian tasks at each grade level. In grade one, significant correlations were observed in the areas of multiple classification (.35-.40); and conservation of liquid (.68). Findings with the grade two subjects indicated that significant correlations existed in the areas of classification (.47) and seriation (.45). Conservation of liquid correlated with reading achievement (.36-.46) for grade three students participating in the study. Robeck concludes from this data that "while a few significant correlations occurred, the correlations are quite small. Furthermore, none of the Piagetian tasks correlated significantly with all three reading measures across all three grade levels" (p.6).

Robeck also did a comparison of the average number of Piagetian tasks performed at the concrete operational level by children scoring below, on and above grade level on the reading assessment. She observed that:

> One first grade child reading above grade level did not perform a single task at the concrete operational level while another first grade child reading below grade level on the silent comprehension and word recognition reading measures performed all but the multiple classification task at the concrete operational level. These types of exceptions could be found at all three grade levels (p. 10).

It would seem evident that based upon these findings, determining readiness for reading instruction cannot solely be determined by a measuring a child's degree of concrete operativity. In summary, Robeck's study suggests that while there may be some degree of correlation between reading achievement and concrete operations, the relationship is vague. Robeck advocates further study in this area.

The purpose of Arlin's (1981) study was to determine which of nine Piagetian tasks could serve as a measure of a child's cognitive developmental

readiness for reading and mathematics. For the purposes of this paper, the results of the reading study will be examined.

In Arlin's study, 192 kindergarten children were selected for participation. Research was conducted in three phases. The first phase consisted of a test (end of kindergarten) and retest (one year later) to assess the children's development of concrete operativity. Piagetian measures were comprised of classification, seriation, and conservation activities. In the second phase of the study, the interrelations among and between Piagetian tasks were compared with the child's performance on the Metropolitan Achievement Test which was administered at the end of grade one. A third phase of the study attempted to identify which components, skills and patterns of acquisition of the entire structure of Piagetian tasks accounted for variance in mathematics and reading achievement.

Results of the Piagetian tasks measured at the end of Kindergarten and grade one showed a correlation of .67 ($p<.01$). Arlin notes that all of the children progressed developmentally from the end of kindergarten to the end of grade one, but that "their relative position within the group was often retained (the test-retest correlation of .67 gives some evidence of this)" (p.720). Variance between individual children was noted in the process of acquiring and integrating the component skills associated with concrete operations. Within the set of tasks used in the study, it was observed that seriation abilities develop early and class inclusion ability was one of the last to be present on the performance level.

Results of the correlations between concrete operativity and reading achievement are similar to those observed by Robeck. All of the correlations are positive, but low, ranging from .16 to .35. Again, from this data, it may be determined that separate Piagetian tasks cannot be used as valid indicators of a child's success in beginning reading instruction. Arlin concludes from her research that knowledge of a child's overall ability in concrete operational tasks may be an important consideration when evaluating a child's academic readiness. "The problem remains to identify precisely what the cognitive demands of these basic school tasks are before attempting to match them with the cognitive constraints represented by a child's general level of operativity" (p. 720).

Reiff, Cannella & Perry (1979) studied the relationship between visual ordering and perception as determined by cognitive tasks and a child's understanding of reading readiness concepts. The subjects in this study were 34 kindergarten children ages 5 years 4 months to 6 years 8 months. Three separate instruments were used to collect data for this study. The Boehm Test of Basic Concepts was used to measure the child's mastery of concepts considered crucial to achievement in the primary grades. Concept categories include space, quantity, time, etc. A second measure used in the study was the SRA Primary Mental Abilities Tests. This instrument is designed to assess multi-factored as well as general intelligence indices for students in grades K-12. Visual seriation was measured using Piaget & Inhelder's cognitive tasks of perception and seriation (Inhelder & Piaget, 1969); (Piaget & Inhelder,1971).

Reiff, Cannella & Perry conclude that their research supports the interrelationship between perception and seriation. They base this conclusion upon correlations ranging from .36 to .57 between the seriation task and all the skills identified.

Although current research has failed to show a direct connection between Piagetian theory and reading acquisition, the groundwork for further study has been laid. Additional studies in the areas discussed may lead educators to

more efficient and accurate techniques of determining when, as well as what types of instruction will best facilitate the acquisition of reading skills in individual children.

Language Factors

The terms emerging literacy, early reading or prereading are frequently used by psycholinguists to describe what was traditionally referred to by educators as the readiness phase of reading development. Psycholinguists assert that the acquisition of concepts pertaining to both oral and written language are major elements contributing to readiness for reading. A comprehensive review of the works of psycholinguists such as Chomsky, Goodman & Goodman, Smith, Vygotsky, and others is not feasible in this review. However, psycholinguists have contributed much to current knowledge related to reading readiness. A brief examination of the major aspects of psycholinguistic theory and its relationship to reading readiness will serve to expand upon the concepts of reading readiness previously addressed in this paper.

In general, psycholinguistic theory emphasizes the complex interplay of a child's environment and his intrinsic structuring of language. The works of Goodman and Smith are frequently referred to in articles discussing language development and early reading skills. Goodman and Smith have presented a view of reading which stresses the cognitive and linguistic processes underlying all language development. Hall (1985) defines Goodman & Smith's concept of learning to read as being ". . . a natural language process involving the reader in linguistic and cognitive strategies for processing print both for meaning and in a meaningful way" (p.58). Tate (1983) also comments upon Goodman & Smith's concept of reading readiness. "In other words, a child is learning to read from the day she begins to perceive her environment and practises interacting in it, as this is the basis from which she shall work to attain reading competence" (p. 57). There is little dispute among educators that environment plays a significant role in a child's acquisition of reading skills. Empirical evidence supports the notion that a literate environment fosters literacy skills in children.

It follows then that children gain insight into the feature and function of print long before formal reading instruction is initiated. Observation of print on road signs, television, food products, etc. is associated with the early stages of print awareness. Goodman & Goodman (1979); Mason (1980); Carter & Stokes (1982) and a variety of others have investigated the role of environmental print in a preschool child's attainment of literacy skills. These investigators have found that when children begin to notice printed words, they become aware that these symbols stand for the names of things. Children then, in their first contacts with print in the environment, observe that print has meaning in terms of its context.

Psycholinguists have also studied children's understanding of the technical language associated with the reading act. Metalinguistic awareness was defined and discussed in the previously cited work of Yopp & Singer (1985). Metalinguistic awareness also relates to the comprehension of the technical language associated with reading instruction. Literature reviewed on this topic frequently alluded to the studies of Vygotsky (1934/1962); Clay (1972); Downing (1972); Fitts & Posner (1967); and others. These theorists suggest that children may encounter difficulty in the initial stages of reading instruction with terms such as letter, word, sentence, etc. Difficulties may also arise when refering to the top of a page and the left to

right convention of reading. Swanson (1984) notes that children may also exhibit a lack of understanding of the function of interword space on a printed page. It appears then, that an essential part of readiness instruction and/or evaluation would include some measure of a child's knowlege of the language and conventions of print.

This synopsis of psycholinguistic theory serves to further delineate the scope of prerequisite skills involved in the process of beginning reading instruction. Psycholinguistic theory provides a global or "whole child" theoretical model of language development in both its oral and written modes.

Conclusion

The previously quoted definitions of reading readiness and maturation seem to be particularly suited to the closing theme of this paper. Knowdlege related to reading readiness has certainly grown in depth and complexity from the days of Morphette, Washburne, and Gates. Additionally, a maturation of the readiness concept can be seen through the increased scope and diversity of topics currently under investigation. The remaining issue in addressing the subject of reading readiness requires an integration of the major areas of research presented in this paper.

Although diverse facets of reading readiness are being explored, there appears to be a trend towards a unification of readiness constructs. This is particularly evidenced in theoretical work of psycholinguists. The model of readiness I propose is three dimensional. First, by linking the theories of perceptual development proposed by Gibson and Firth with the cognitive framework proposed by Chall, Waller, and others, a two dimensional model will emerge. Finally, by connecting these developmental constructs to whole language, or psycholinguistic theory, a three dimensional model of reading readiness will be developed.

The acquisition of perceptual and cognitive skills appear to evolve, to some degree, in a linear and sequential order. Gibson's (1985) observation of perceptual trends which increase in specificity, accuracy, and economy seem to correlate with Piaget's model of cognitive development. Consider the gross cognitive skills acquired in Piaget's sensorimotor stage, as compared to the more finely tuned skills acquired in subsequent stages of cognitive development. This sequential progression of perceptual and cognitive skills may be taken one step further.

Perception, be it visual, auditory, or sensory must be correctly interpreted by the cognitive aspects of the brain. Therefore, it is evident that these first two components of the proposed readiness model are interactive. At this point, it is pertinent to reconsider Downing & Lundsteen's (1980) observation regarding the interconnectedness of perception and letter recognition. "As Piaget has shown, children learn names for things after they have learned to discriminate them" (p.20). Perceptual and cognitive interaction is also seen in Yopp & Singer's study. The study advocated activating a child's metalinguistic awareness in the performance of a perceptual task (i.e. auditory discrimination).

The many facets of language development will now be incorporated into this three dimensional model. As with perception and cognition, language development unfolds in stages. This can be observed in the babblings of an infant, which evolve into the two and three word strings of the toddler, and later, into the highly developed syntax and speech of the five year old. Language is the vehicle for expressing the child's emerging concepts of the

world as he or she perceives it. More importantly, language is a vehicle for thought. These points clearly illustrate the interaction which occurs between language, perception, and cognition.

This three dimensional model supports research which suggests that a teachable moment for reading does not occur at some specific point along a continuum. Rather than approaching readiness training and assessment in a fragmented manner, this global model allows educators a perspective of readiness which accomodates parallel growth in all of the essential skill domains.

The nature of instruction, as pointed out by Gates, Durkin, Gibson and others has a significant impact upon a child' successful transition from oral to written contexts. Letter recognition studies, auditory perception studies, as well as psycholinguistic theory all point to the importance of teaching geared to the specific skills associated with the reading act. Moreover, this research highlights the importance of tailoring instruction to the developmental needs and capacities of the learners. Simply waiting for the neurological maturation of a child, as espoused by Morphette and Washburne, will not foster growth in essential skill areas. If, as psycholinguists suggest, environment has a significant impact on the emergence of literacy skills, then an instructional climate rich in oral and written language models and activities will enhance the development of such skills.

Accurate assessment of the attainment of essential reading prerequisites is a necessary correlate to instruction. Here too, measurement of those skills most closely associated with the act of reading appear be the most valid indicators of subsequent reading achievement. These types of tests are not only valuable for predictive purposes, but can provide diagnostic information in terms of learner needs as well.

As was suggested throughout this text, there are many aspects of reading readiness that are in need of further examination. More study is needed in providing a holistic definition of reading readiness. Additionally, further research and development of appropriate instructional stategies more closely related to the reading process would enhance current readiness programs. Finally, more accurate measures of perceptual, cognitive and language development will provide educators with a more definitive answer to the big question:

"Are they ready?"

References

Arlin, P. K. (1981). Piagetian tasks as predictors of reading and math readiness in grades K-1. Journal of Educational Psychology, 73, 712-721.

Chall, J. S. (1983). Stages of reading development. New York: McGraw-Hill.

Cohen, R. (1985). Early reading: The state of the problem. Prospects: Quarterly Review of Education, 15, 41-48.

Craig, R. P. (1984). Developing a philosophy of reading: Piaget and Chomsky. Reading Horizons, 25, 38-42.

Downing, J. & Lundsteen, S. (1980). Understanding new perspectives of early childhood: What does research tell us about children? In L. O. Ollila (Ed.), Handbook for administrators and teachers: Reading in kindergarten (pp. 18-41). Newark: International Reading Association.

Durkin, D. (1977). Facts about pre-first grade reading. In L. O. Ollila (Ed.), The kindergarten child and reading (pp. 1-12). Newark: International Reading Association.

Durkin, D. (1980). Readiness for beginning reading. In D. Durkin, Teaching young children to read (pp. 47-78). Boston: Allyn & Bacon.

Frith, U. & Vogel, J. (1980) Some perceptual prerequisites for reading. Newark: International Reading Association.

Gates, A. (1937). The necessary mental age for beginning reading. Elementary School Journal, 37, 497-508.

Gibson, E. J. (1985). Trends in perceptual development: Implications for the reading process. In H. Singer & R. Ruddell (Eds.), Theoretical models & processes of reading (3rd ed.) (pp. 144-173). Newark: International Reading Association.

Gray, W. S. (1941). Reading readiness. In J. T. Guthrie (Ed.), Reading: William S. Gray: A research retrospective, 1881-1941 (pp. 48-53). Newark: International Reading Association.

Groff, P. Research versus the psycholinguistic approach to beginning reading. The Elementary School Journal, 81, 53-58.

Hall, N. (1985). When do children learn to read? Reading, 19, 57-70.

Harris T. L. & Hodges R. E. (1981). A dictionary of reading and related terms. Newark: International Reading Association.

Kavale, K. (1980). Auditory-visual integration and its relationship to reading achievement: A meta-analysis. Perceptual and Motor Skills, 51, 947-955.

Mason, J. M. (1984). Early reading from a developmental perspective. In P. D. Pearson (Ed.). Handbook of reading research (pp. 505-544). New York: Longman.

Morphette, M. V. & Washburne, C. (1931). When should children begin to read? Elementary School Journal, 31, 496-503.

Ollila, L. O. (1980). Foundations: What have we learned about kindergarten reading programs? In L. O. Ollila (Ed.), Handbook for administrators and teachers: Reading in the kindergarten, (pp. 1-15). Newark: International Reading Association.

Palardy, J. M. (1984). Some thoughts on systematic reading readiness instruction. Reading Horizons, 24, 167-171.

Reiff, J. C., Cannella, G. S. , & Perry, B. L. (1979). Relating readiness for reading with perception and visual seriation skills. Reading Improvement, 16, 236-241.

Robeck, C. P. (1981). An investigation of the relationship between concrete operational thought and reading achievement. Reading World, 21, 2-13.

Swanson B.(1984) Readiness for reading readiness. Reading Horizons, 24, 105-110.

Tate, A. (1983). Myth and reality of reading readiness. Australian Journal of Reading, 6, 57-64.

Waller, T. G. (1977). Think first, read later! Piagetian prerequisites for reading. Newark: International Reading Association.

Waterhouse, L. H. , Fischer, K. M. & Ryan, E. B. (1980). Language awareness and reading. Newark: International Reading Association.

Yopp, H. K. & Singer, H. (1985). Toward an interactive reading instructional model: Explanation of activation of linguistic awareness and metalinguistic ability in learning to read. In H. Singer & R. Ruddell (Eds.) Theoretical models & processes of reading, (pp. 135-143). Newark: International Reading Association.